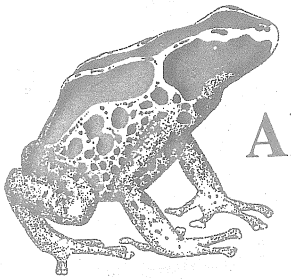

Dendrobates tinctorius
(2 White morph variants).

AMERICAN DENDROBATID GROUP

Newsletter No. 28 July-August 1996

STATEMENT OF PURPOSE

The purpose of the American Dendrobatid Group (ADG) is to educate enthusiasts and distribute information on all aspects of Dendrobatid husbandy and captive propagation, and to develop better communication between Dendrobatid breeders. The ADG is also interested in the maintance and propagation of Mantellid frogs, Atelopid toads, and other unusual frogs and toads. Its format and bimonthly distribution are designed to provide current information and new developments in the hobby. This Newsletter appears six time a year at a cost $15.00 per calander year. Back issues for $3.00 each, or on a yearly basis: 1992 isavailable for $5.00; 1993 and 1994 for $10.00/year, and 1995 for $12.50.

Subscriptions, comments, articles, photographs, etc. should be sent to Charles Powell (2932 Sunburst Dr., San Jose, CA 95111 Tel.: (408) 363-0926) .

INSIDE

Husbandry and Breeding of *Dendrobates auratus* - the green and black poison frog (Part 2)

Ian Hallett

Acquisition and Acclimatization - behavior observations

In January 1995 2.1 typical green-black *Dendrobates auratus* with bright metallic green stripes were acquired from a local dealer. These had been imported from Florida and were in poor shape when they arrived. The larger female had a 3 mm round sore on her nose and one of the males was missing a digit on one of its front legs. The toe bone was visible projecting from the area where the male's toe had been. A veterinarian was consulted who prescribed a tropical treatment of Chloramphenicol ointment and a high heat and humidity. The affected frogs were isolated and kept in a covered tank at 30°C. After 8 days of twice-daily application of the ointment no progress was noted. The sore on the female had become larger and the bone of the skull and a quantity of blood were visible. Consultation with a Ph.D. student at York University indicated that Polysporin was a good antibiotic for frogs and treatment was switched to this. In addition, a 1% solution of hydrogen peroxide was applied with the twice daily ointment administrated using the same fine artists paint brush which was used to apply the ointment. Within 10 days the sore on the female's nose had completely healed over and the male's toe has also healed. The male has since bred. The female, although in excellent health, has been thwarted in her breeding attempts by other, more dominant females, as shall be discussed.

In April 1995, another 1.1 frogs, including a female of a brilliant green-blue were acquired and introduced to the other frogs in the set-up after a three week quarantine. Within 2 weeks of introducing the new frogs, a definite hierarchy had developed within the colony of 3.2 individuals. Two of the males took up distinct territories and were seen to chase intruders away. Breeding huts were introduced in late April and calling was observed in early May. The call of *D. auratus* is a low, indistinct trilling buzz,

and was noticed early each morning and after each heavy spraying. Feeding and misting were increased at this time in preparation of anticipated breeding.

Breeding

Other breeding behaviors were noticed among the frogs at the same time as the calling began. The dominant blue-green female was seen to be frequenting one of the breeding huts with a smaller male. The three breeding huts consisted of the standard half coconut shell, with a notch in it, inverted over a green plastic flowerpot saucer containing 2 plastic plant leaves about 4 cm long. One to two mm of aged, dechlorinated tap water was placed in each saucer and they were checked and cleaned of tracked in soil daily. Three of these breeding huts were placed as far apart as possible around the terrarium with leaves from live plants disguising their entrances. The two females were also observed in mating interferences on numerous occasions. To date, only the dominant female has bred. The terrarium used appears too small to support more than one breeding pair of these highly territorial frogs. With the acquisition of another male frog, plants are underway to split the frogs into two colonies of 2.1 (males.females) individuals each.

On the morning of May 12th a clutch of five eggs was discovered in one of the breeding huts, laid in a small group on one of the plastic leaves. The saucer containing the eggs was immediately removed and placed in a small covered Styrofoam container. Since then the female has laid clutches about every 20 days, for a total of 8 clutches. The number of eggs has ranged from three to nine, with five or six being the most common. All clutches have been laid in the breeding hut provided. In early October feeding was reduced and the humidity was lowered in order to give the frogs a rest from breeding. Although they will breed almost continuously throughout the year, this seems to stress the frogs and reduce their life span. During the dry period only one clutch of eggs was laid. In January the humidity was increased and feeding intensified and regular breeding activities began again.

Raising eggs and tadpoles

Parental care of the eggs is often absent in captive frogs and so the eggs were removed for artificial rearing. The soil which the frogs had tracked into the saucer was misted away from the eggs as much as possible without disturbing the eggs (the eggs are extremely sticky and it is almost impossible to shift them - which presents a problem when removing a fungused egg). The water level in the saucer was raised to about 2 mm, enough to wet the eggs, but not submerge them, and a broad spectrum fungicide for tropical fish was added to the water prior to it's addition. The dosage was two drops per 250 ml of water, while the regular dose for this fungicide is one teaspoon per 5 gallons of water (for tropical fish). Over the next three days the eggs polarized and became a dull grey color. There is a distinct pattern to this gray and the tadpole shape in it becomes more apparent on about the 4th day. From there, tiny tadpoles emerged from the surface of each yolk, with the round part of the egg becoming a dull yellow mass below the tadpoles stomach. By the eight day the tadpoles were beginning to wiggle furiously when disturbed. By the 12th to 14th day they were almost completely formed, tiny tadpoles about 8 mm long with a tiny head. At this point the water was raised to about 4 - 5 mm in the saucer. The gel mass had begun to disintegrate and the long filamentous external gills, which extend into the gel mass, were absorbed. After about 15 days the tadpoles were free-swimming and were removed to their own individual rearing containers.

Even with the addition of the fungicide, in almost every clutch at least one egg was lost to fungus and was promptly removed to prevent contamination of the remaining eggs. This generally occurred in the first few days after laying. Tadpole mortality was most noticeable when the newly

developed tadpoles were transferred from the saucer to their own dish. In the first clutch, 40% (2 of 5) of the tadpoles died within two days of transfer and this is probably due to moving them too early, before they were fully formed and had absorbed their external gills from the gel mass. The tadpoles should only be moved when they are entirely free-swimming, the external gills have been absorbed and they are free from the gel mass. This may take from 14 to 19 days from laying. A good indicator of readiness for transfer is that the tadpoles will lose its usual curled position, will extend its tail straight out and sit in the water in the usual dorsum-upright position rather than curled on its side. From the 6th clutch onwards, tadpoles were left in the saucer for 3 days after becoming free swimming and mortality was significantly reduced. Cannibalism is not a concern at this stage, since the tadpoles are still absorbing their egg yolk and do not begin eating until 4 to 5 days after becoming free swimming.

Rearing *D. auratus* tadpoles is a laborious process. The tadpoles are reputed to be cannibalistic and should be reared separately - at least during their first few weeks. In this case 12 oz. plastic cups, about half filled with aged, dechlorinated tap water were used. The cups were filled about 1/2 full since the tadpoles become very active as they grow and may jump out of the cups. Water quality is of great importance. Not only must the water be clean, but it must contain enough calcium to ensure proper development of the tadpoles. The water in southern Ontario is generally quite hard and rich in calcium. Methods of raising the calcium content of the water, if required, include placing a pinch of calcium supplement in with each feeding (Hesselhaus, 1992) or adding crushed coral to the water container.

About five days after becoming free-swimming the tadpoles begin to eat. The tadpoles were fed on a variety of flake foods, primarily those intended for herbivorous fish. In the wild they live on algae and insect larvae. Two of the staple foods used were Spiralina flakes, which are spirulina algae in a fish meal base, and chopped, boiled spinach. Frozen brine shrimp were also offered, but these did not seem to be eaten. The flake foods, especially, quickly fouled the water, which was replaced every one to two days.

The tadpoles grew rapidly. They were initially about 10 mm long with a 2-3 mm long oblate head. Within four weeks they were 20 mm long and rear limb buds appeared. The front legs erupted about 2 weeks later and the green pattern started to become apparent on the black tadpoles At about seven to eight weeks after hatching the tadpoles were identifiable as froglets, with full legs, a muted black and green coloration, but still possessing a full tail. At this point all 3 remaining froglets from the first clutch were placed together in a small plastic fin-pal container with about 15 mm of water and a rock in the center for the froglets to climb out on. Chopped spinach was provided as food, but this was not seen to be eaten. Over the next 10 days their tails were absorbed and the tiny 8 mm long froglets left the water, choosing to climb up the sides of the container rather than use the rock provided. The froglets were almost exact duplicates of their parents, except that the intense green and black pattern was less pronounced and consisted of black stripes and dots down the froglets' predominantly green bodies. Although the tadpoles start out black in color they turn predominantly green after metamorphosis, with the black pattern only taking over after a few months of terrestrial existence. The appearance of these tiny, living jewels was well worth the time invested in water changes, cleaning and food preparation. To date none of the froglets from any clutch have manifested spindly leg syndrome, which is sometimes seen in captive breed Dendrobatids. The cause for this syndrome is debatable, but it may be linked to an insufficient diet or quality of food, or may be due

to genetically deficient parents. Personal correspondence with a zoo keeper at the Metro Toronto Zoo indicates that they had a problem with spindly-leg syndrome in froglets, which disappeared after chopped, cooked spinach was added to the diet of the tadpoles. Others (Heselhaus, 1983) contend that diet alone cannot be the cause of this syndrome and further research is needed. Whatever the cause the tadpoles must be kept clean, well fed on a vegetable-rich diet and warm if the are to thrive and develop properly.

The three surviving froglets from the first clutch were placed in a 15-gallon aquarium with a substrate of sphagnum moss and artificial plants. An under-tank heat pad and a fluorescent light were provided. Within five days, after they had absorbed their tails, the froglets began eating newly hatched crickets which were provided daily with a calcium and vitamin supplement. At three months of age the froglets are now from 12 to 16 mm long and are nearly exact duplicates of their parents. Nine other froglets from subsequent clutches have been place in the rearing terrarium. Growth in variable and the froglets will soon be separated according to size, to reduce competition for food amount them.

Dendrobates auratus makes an ideal first frog for new enthusiasts. They are relatively inexpensive compared to some of the other poison frog (but still command a premium price on the Canadian market), reach a reasonable size and the tadpoles can be raised on flake fish food. At present Dendrobatids are not commonly seen for sale in Canada, even in specialty pet shops. Many species of Dendrobatids are threatened in the wild due to habitat destruction. Zimmerman (1989) recounts the conversion of a large tract of forest in Ecuador to banana and pineapple plantations and the corresponding decline and assumed extirpation of a population of D. histrionics which he was studying in the area. Despite protection under CITES Appendix II, some Dendrobatids are still imported in quantities from the wild (especially *D. pumilio*). Wild-caught individuals fare poorly in captivity and are often laden with parasites. They are particularly prone to 'scratching disease' and I know of one individual who's very costly pair of wild caught D. auratus died from the affliction. There are now at least 20 species of Dendrobatids being bred in captivity and for successful husbandry, and preservation of the unique amphibians, it is recommended that captive-bred individuals be obtained.

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HELPFUL HINTS

This issue's 'helpful hint' comes from the FrogNet via Christian Som of Switzerland. It deals with high protein diets for tadpoles as outlined by Paul Bolognese (ADG #25). Christian writes "...pay attention not to feed too much protein. At the University of Zurich, we did several tests on thousands of tadpoles with different food combinations. Tadpoles with high protein food grew fast and metamorphed early. So far, so good, but many ended up with spinal distortions. We think, the reason for this is that they grew too fast with too little vitamins and minerals. The studies were done on European waterfrog tadpoles but I have noted the same effect with many Dendrobatids. Flake food is fine but contains very little fiber. If you see feces dangling from the butt of your tadpoles they have too little fiber in their food. I would recommend feeding frozen mosquito larva as they seem to provide fiber and appear to be a major constituent of tadpole diets in the wild. Use them together with spirauline disks and this should be fine."

ANNOUNCEMENTS

Dutch Poison Frogs: If there is enough interest (enough to pay for his trip) Hans Zwoferink of the Dutch Dendrobatid Frog Group will bring captive breed Dendrobatids from Europe to the Second American Frog Day. If you are interested in frogs, or have question on species available and prices, please contact him directly at Holtenstraatig 19, 5045 CE Tilburg, HOLLAND. Tel.: +135705248. Please remember to contact him as soon as possible so he can figure out if he can make the trip and to get CITES documents. He also still has available some of the 1991 translations of the Dutch Dendrobatid Group Newsletter.

Second American Frog (Amphibian) Day: The Second American Frog (Amphibian) Day has been scheduled for Saturday September 7th this year. It will, again, be held at First Assembly of God Church on Hellyer Ave. from 9 AM to 4 PM. Admission is $3 in advance or $5 at the door. Guess speakers include Dante Fenolió, Anthony Hundt, Ted Kahn, Charles Powell and others. Please contact the Newsletter editor if you are interested in selling frog, or other products, or giving a presentation at Frog Day.

PRODUCT REVIEW

Rainmaker 1™ Misting System. The Rainmaker 1™ misting system has proven an invaluable tool in keeping Dendrobatid frogs and many other amphibians and reptiles. Misting and high humidity helps to keep poison frogs healthy and activeand seems to start breeding activity in some species. This misting system completely takes away the choir of daily hand misting. It is very easy to assemble and comes with enough parts to customize the misting system to your terrariums. The standard Rainmaker 1™ system (which includes a high pressure pump, master single nozzle misting module, standard single nozzle misting modules, high -pressure tubing, installation package, five-gallon reservoir, and 12-cycle digital timer) sells for $269. Now this may seem expensive, but when you

consider the prices of the frogs and the terrariums we design for them its a minimum expense, especially considering that it can be connected to multiple tanks (up to 20!, according to literature provided). The high quality electronic digital clock/timer is the best I've seen - its allows up to 6 on/off cycles per day and includes a battery so when the electricity fails you don't loose your programing. Steve Kovalick the designer and producer of the Rainmaker I™ misting system is actively seeking the help of Dendrobatid breeders to produce a better product and I think he has more than succeeded. All parts can be purchased individually and upgrades of the pump (which tends to be a bit noisy, but then isn't on all that long) are available. I can , without reservation, recommend Ecologic Technologies Rainmaker I™ misting system. For further information contact Ecologic Technologies, P. O. Box 1038, Pasadena, MD 21122. Phone: (410) 255-8486; Fax (410) 25504474. Charles Powell, II, revier.

If you have products you'd like reviewed contact the Newsletter editor for information regarding the review process.

NEW LITERATURE

Dendrobatids

Pinney, Roy, 1991 (March/April), Poison Arrow Frogs. Reptile & Amphibian Magazine: 2-7 (note that the picture on p. 15 labeled *Dendrobates auratus* is not; also the upper picture on p. 6 labeled as *D. histrionicus* is *D. imitator*).

Walls, Jerry G., 1995 (March/April), Phantasmal Poison frogs. Reptile & Amphibian Magazine: 12-17 (note that the lower picture on page 15 is not an *Epipedobates tricolor* but probably either *E. femoralis* or *E. hahneli*).

ADS:

Rates for business card adds are $10 per issue or $50 per year. If you are interested please contact the Newsletter editor.

REPTILE SPECIALITIE (John Uhern, 7473 Foothill, Tujunga, CA 91042 Tel. (818) 352-1796; Fax (818) 353-7381) has various captive breed Dendrobatids and wild imported *Mantella* for sale. Write or call for information.

For Sale

Ads for sale of frogs, or requests or offering of breeding loans, etc. are free to members and will run for two issues only, unless the Newsletter editor is notified.

Dendrobates leucomelas	$45. ea.	Eric Anderson
Dendrobates histrionicus, 2 yr. captive, entire body mottled w/orange dots that bleeds to brown body (1.0 w.c.)	$60.	12231 Newberry Rd. Gainesville, FL 32607 (904) 332-7908
Dendrobates trivittatus, 1/2 grown, nice metallic green (0.1 c.b.)	$100.	
Epipedobates tricolor, red w/light blue doro-laterial stripes, center stripe yellow, currently producing eggs (1.1 c.b.)	$140/pair	
Epipedobates tricolor, 4 yr. captives, brown 2/light blue stripes (1.2 w.c.)	$120/trio	

Dendrobates azureus	$150 ea.	Chip Blackburn
Dendrobates leucomelas	$50 ea.	319 Mt. Vernon Ave.
Dendrobates tinctorius 'powder blue'	$75 ea.	Alexandria, VA 22301 (703) 549-5827

Dendrobates auratus 'metallic morph' F1	$50 ea.	Juan Casanova
Dendrobates auratus 'Costa Rica' F1	$25 ea.	813 N. W. 23 Ct.
Dendrobates azurues 'teal morph' F1	$160 ea.	Miami, FL 33125
Dendrobates tinctorius 'cobalt w lots of yellow' F1	$60 ea.	(305) 642-9694
Dendrobates tinctorius 'cobalt-green morph' F1	$75 ea.	(305) 541-4039
Dendrobates tinctorius 'powder blue'	$65 ea.	

Epipedobates tricolor (wine red with blue)	$35 ea.	Peter Fippinger
Phyllobates vittatus	$45 ea.	2535 Clermont St.
Mantella expectata (1.2, w.c.)	$35 ea.	Denver, CO 80207
Mantella laevigata (4 c.b., adults)	$45 ea.	(303) 399-5684
Microhylid achatina (1.2, w.c.)	$25 ea.	

Dendrobates reticulatus tadpoles	$30 ea.	Melissa Gaglardo
froglets	$40 ea.	317 SW 9th Ave. E Fort Lauderdale, FL 33312 (954) 767-6059

Dendrobates tinctorius 'cobalt, 'giant orange,' and 'white,' and some *Dendrobates azureus*. Ted R. Kahn (P. O. Box 1375, Sterling, VA 20164-1375. Tel.: (703) 242-4543.

Dendrobates auratus 'blue'	$75 ea.	Todd D. Kelley
Dendrobates imitator	$50 ea.	1469 Okanogan Ave.
Dendrobates tinctorius 'pallid'	$60 ea.	Wenatchee, WA 98801
Dendrobates tinctorius 'cobalt'	$50 ea.	(509) 665-9589
Red-eyed tree frogs and other Dendrobatids		e-mail: TDKelley@aol.com

Dendrobates auratus 'Costa Rica'	$25 ea.	Eric Pflaging
Dendrobates leucomelas	$60 ea.	Hillside Herps
10% discount for ADG members		220 Hillside Dr.
		Clermont, FL 34711
		(352) 242-1616
Dendrobates auratus 'Hawaii'	$25 ea.	Alicia Pinzari
Dendrobates tinctorius 'cobalt'	$70 ea.	1207 Lunaai St.
		Kailua, HI 96734-4546
		(808) 262-5718
Dendrobates auratus 'green/blue, Panama' F1	$40 ea.	Charles L. Powell
Established animals:		2932 Sunburst Dr.
Mantella expectata 'yellow' (3)	$35 ea.	San Jose, CA 95111
Mantella pulchra 'green' (1)	$35 ea.	(408) 363-0926
will consider trades for the mantellas		
Tadpoles:		
Dendrobates auratus 'green/blue, Panama' $30 ea.		
Dendrobates azureus	$120 ea. (3/$330)	
Dendrobates tinctorius 'cobalt'	$50 ea.	Dave Ryan
Dendrobates tinctorius 'powder blue' F1	$75 ea.	3350 21st Ave. SW
		Naples, FL 33964
		(941) 353-3113
		DRyan51724@aol.com
Dendrobates auratus 'Costa Rican'	$25 ea.	Aaron Savino
Dendrobates auratus 'Hawaii'	$25 ea.	211 S. Fremont St., #110
Epipedobates tricolor 'Santa Isabela, Ecuador'	$25 ea.	San Mateo, CA 94401
		(415) 347-5198
Established animals:		Gregory J. Sihler
Mantella expectata (8)	$35 ea.	P. O. Box 26528
		Tempe, AZ 85285
		(602) 804-1223
		adicus@primenet.com

Wanted:

Dendrobates lehmanni	Juan Casanova
	813 N.W. 23 Ct.
	Miami, FL 33125
	(305) 642-9694
Dendrobates auratus 'Tabago Island'	John DiLello
Dendrobates tinctorius 'yellow back'	72 Frog Hollow Rd.
	Califon, NJ 07830
	(908) 832-2232

Dendrobates pumilio - female
Epipedobates trivittatus '3 strippes'

Ron Gaglardo
1180 Oldfield Rd.
Decatur, GA 30030
(404) 373-4601

Dendrobates lehmanni
Dendrobates silverstonei
Phyllobates terribilis

Anthony Hundt
P. O. Box 284
Ottawa, IL 61350
(815) 433-4679 (Monday, Thursday, Friday, Saturday, after 5:30 PM CST)
thundt@rs232.bb-elec.com

Epipedobates tricolor (chocolate brown with three lime green stripes, light green marbled belly and red flash marks on the hind legs). Females wanted for purchase or breeding loan. Contact John Lewis (717 Bromley Rd., Bromley, KY 41017. Tel.: (606) 344-8796).

Dendrobates imitator 'green' - female
Dendrobates azureus - female'
will buy or trade

Eric Flagging
Hillside Herps
220 Hillside Dr.
Clermont, FL 34711
(352) 242-1616

Dendrobates pumilio established w.c. or c.b.

Melissa Gagliardo
317 SW 9th Ave. E
Fort Lauderdale, FL 33312
(954) 767-6059

Dendrobates leucomelas - female

Jeff McClure
1331 Longfellow Dr.
Clarksville, IN 47129

Dendrobates auratus 'blue' - male
(can trade female)
Dendrobates fantasticus - male

Charles Powell
2932 Sunburst Dr.
San Jose, CA 95111-2264
(408) 363-0926

Dendrobates tinctorius 'yellow back' - male

Gregory J. Sihler
P. O. Box 26528
Tempe, AZ 85285
(602) 804-1223
adicus@primenet.com

Dendrobates tinctorius 'cobalt' - male
Any information or photographs of *D. occultator*

Blake Wood
6508 South 250th East Ave.
Broken Arrow, OK 74014
(918) 357-2034
FAX (918) 357-2657

Societies

AMERICAN TARANTULA SOCIETY: For enthusiasts and scientists. Forum magazine (6/yr) educational, entertaining and readable. Over 150 Accurate scientific & common names of tarantulas and scorpions in each issue. Contact: ATS, P. O. Box 2594, S. Padre Island, TX 78597. $15/year US, $20 Canada, $30 elsewhere.

CHAMELEON INFORMATION NETWORK: The CiN is a member supported organization with an interest in the old world family of Chamaeleonidae. It publishes a quarterly publication (The CiN Newsletter) for $12/4 issues, $22/8 issues. Foreign subscribers add $1.50 for each issue. For subscription information contact: Ken Kalisch, 412 West E St., Encinitas, CA 92024. Tel.: (619) 436-7978. Send all payments to: Ardi Abate, 13419 Appalachian Way, San Diego, CA 92129.

INTERNATIONAL HYLID SOCIETY: A new, non-profit organization dedicated to treefrogs enthusiasts worldwide. "The Bulletin of the International Hylid Society" will be published quarterly starting in January/February 1996. Membership is $15/calendar year. For information or membership contact: William Brown, Amphibian Conservation and Research Center, 1423 Alabama St., Lafayette, IN 47905 USA. Tel: (317) 742-5331; e-mail: 102436.2415@compuserve.com.

NEW MEMBERS

John Adamek (Illinois)
Francis Bassani (New Jersey)
Brandon Gibson (Arkansas)
Jerry Kinder (Texas)
Robert Larocque (Quebéc, Canada)
Barbie Marks (Connecutt)
Curtis Olson (Virginia)
Bengt Olsson (Stockholm, Sweden)
Tondree Robinson (Florida)
Donald Stacy, III (Pennsylvania)
Dan Waligora (California)
William Zmich (Ohio)